



Tom Simril
Vice President
Catawba Nuclear Station

Duke Energy
CN01VP | 4800 Concord Road
York, SC 29745

o: 803.701.3340
f: 803.701.3221

RA-20-0336

10 CFR 50.73

November 5, 2020

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Carolinas, LLC
Catawba Nuclear Station, Unit 1
Docket No. 50-413
Licensee Event Report (LER) 413/2020-003-00

Pursuant to 10 CFR 50.73(a)(1) and (d), attached is LER 413/2020-003-00, entitled "Valid Actuation of the Unit 1 Reactor Protection System and Auxiliary Feedwater System."

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

There are no regulatory commitments contained in this letter or its attachment.

This event is considered to be of no significance with respect to the health and safety of the public.

If questions arise regarding this LER, please contact Sherry E. Andrews of Regulatory Affairs at (803) 701-3424.

Sincerely,

A handwritten signature in black ink that reads "Tom Simril". The signature is fluid and cursive, with the first name "Tom" and last name "Simril" clearly distinguishable.

Tom Simril
Vice President, Catawba Nuclear Station

Attachment

xc (with attachment):

L. Dudes
Regional Administrator
U.S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, GA 30303

K. Cotton
NRC Project Manager (CNS)
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mailstop O-8G9A
Rockville, MD 20852

J. Austin (without enclosure)
NRC Senior Resident Inspector



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollect.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: omb_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Catawba Nuclear Station, Unit 1	2. Docket Number 05000413	3. Page 1 OF 5
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4. Title
Valid Actuation of the Unit 1 Reactor Protection System and Auxiliary Feedwater System

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
09	08	2020	2020	- 003 -	00	11	05	2020	Facility Name	Docket Number
										05000
									Facility Name	Docket Number
										05000

9. Operating Mode

1

10. Power Level

100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

☐ Other (Specify here, in Abstract, or in NRC 366A).

12. Licensee Contact for this LER

Licensee Contact

Sherry E. Andrews

Phone Number (Include Area Code)

(803) 701-3424

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To IRIS	Cause	System	Component	Manufacturer	Reportable To IRIS

14. Supplemental Report Expected

☒ No ☐ Yes (If yes, complete 15. Expected Submission Date)

15. Expected Submission Date

Month Day Year

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 0925 [EST] hours on September 8, 2020, with Unit 1 in Mode 1 at approximately 100 percent power, Catawba Unit 1 experienced an automatic reactor trip on Overpower Delta Temperature. During routine Nuclear Instrumentation System calibration activities, Unit 1 Channel 1 Overpower Delta Temperature was placed in a tripped condition as part of a planned evolution. As a result of human error, an inadvertent Channel 2 Overpower Delta Temperature signal was received which initiated the reactor trip. The trip was not complex, with all systems responding normally post-trip. Because of the reactor trip, the Auxiliary Feedwater system actuated as expected due to an Anticipated Transient Without Scram Mitigation System Actuation Circuitry signal.

The cause of the reactor trip was a human performance error in which a performer did not perform self-checking prior to pulling a Nuclear Instrumentation System power range drawer. Corrective actions include appropriate accountability and remediation actions with a focus on specific behaviors for all maintenance plant manipulations.

There was no impact to the health and safety of the public.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Catawba Nuclear Station, Unit 1	05000-413	2020	- 003	- 00

NARRATIVE**BACKGROUND**

The following information is provided to assist readers in understanding the event described in this LER. Applicable Energy Industry Identification [EII] system and component codes are enclosed within brackets. Catawba Nuclear Station unique system and component identifiers are contained within parentheses.

This event is being reported under the following criterion:

10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B)." The applicable 10 CFR 50.73(a)(2)(iv)(B) systems include the Reactor Protection System and the Auxiliary Feedwater System.

The Reactor Trip System automatically limits reactor operation to within a safe region by shutting down the reactor whenever the limits of the region are approached. Whenever a direct process or calculated variable exceeds a setpoint the reactor will be shutdown in order to protect against either gross damage to fuel cladding or loss of system integrity which could lead to release of radioactive fission products into the containment. The various reactor trip circuits automatically open the reactor trip breakers whenever a condition monitored by the Reactor Trip System reaches a preset level. The protection and monitoring systems have been designed to assure safe operation of the reactor.

Each of the analyzed accidents and transients can be detected by one or more Reactor Trip System Functions. One of the Reactor Trip System Functions is Overpower Delta Temperature (OPDT). The OPDT trip function ensures that protection is provided to ensure the integrity of the fuel under all possible overpower conditions. This trip function also limits the required range of the Overtemperature Delta Temperature trip function and provides a backup to the Power Range Neutron Flux-High Setpoint trip. The OPDT trip function ensures that the allowable heat generation rate of the fuel is not exceeded. OPDT compares reactor power from Nuclear Instrumentation to the thermal power measured via reactor coolant system temperature detectors. If reactor power differs from thermal power by more than allowed by setpoint, a reactor trip is indicated.

The Nuclear Instrumentation System (NIS) monitors reactor power at all power levels. For monitoring reactor power during power operations, Catawba is furnished with four power range channels (N41, N42, N43, and N44). These channels receive input from field mounted detectors, which then produces reactor power indications and reactor trip alarms. The four NIS channels are located adjacent to one another in the Control Room.

The Auxiliary Feedwater System [BA] (CA) assures sufficient feedwater supply to the steam generators (S/G), in the event of loss of the Condensate/Feedwater System, to remove energy stored in the core and primary coolant. The CA System may also be required in some other circumstances such as evacuation of the main control room or cooldown after a loss-of coolant accident for a small break, including maintaining a water level in the steam generators following such a break.

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BACKGROUND (continued)

The CA System is designed to start automatically in the event of loss of offsite electrical power, trip of both main feedwater pumps, safety injection signal, or low-low S/G water level; any of which may result in, coincide with, or be caused by a reactor trip. The CA System will supply sufficient feedwater to maintain the reactor at hot standby for two hours followed by cooldown of the Reactor Coolant System to the temperature at which the Residual Heat Removal System may be operated.

The motor driven auxiliary feedwater pumps will automatically start and provide the minimum required feedwater flow within one minute following any of these conditions:

1. Two out of four low-low level alarms in any one of the four steam generators.
2. Loss of both main feedwater pumps
3. Initiation of the safety injection signal
4. Loss of station normal auxiliary electric power
5. AMSAC signal

An Anticipated Transient Without Scram (ATWS) is an anticipated occurrence which is accompanied by a failure of the Reactor Trip System to shut down the reactor. ATWS Mitigation System Actuation Circuitry (AMSAC) actuation will occur when either both main feedwater pumps trip or when main feedwater flow to the steam generators is blocked due to valves closing in the line. When an actuation occurs, the AMSAC circuitry will perform the following:

1. Trip the main turbine
2. Start both motor driven auxiliary feedwater pumps
3. Close the steam generator blowdown and sampling valves

The AMSAC design for Catawba is based on conditions that indicate a loss of main feedwater event, which if accompanied by a failure of the RPS to scram leads to over-pressurization of the Reactor Coolant System. The system monitors the position of all Main Feedwater Control Valves, Feedwater Bypass Control Valves, and Feedwater Isolation Valves (Unit 1 only) and the operating status of both main feedwater pumps.



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EVENT DESCRIPTION

Timeline of Events:

9/8/20: Technicians A and B performed Pre-Job Briefing for activity. Control Room briefing also performed.

9/8/20: Technicians A and B arrived in field to perform work. Technicians placed Unit 1 Channel 1 OPDT bistable switch to TEST. Component verification performed and flagged correct drawer (1N41) and control power fuses removed.

9/8/20: Technicians went behind panel to perform component verification and removed high voltage cable from 1N41.

9/8/20: Technician A returned to the front of the panel while Technician B remained behind panel rack to ensure cables did not snag as drawer was pulled. Drawer 1N41 required to be pulled to perform calibration activities. Technician A inappropriately pulled drawer 1N42 approximately 6 inches, which sent an erroneous signal to the Channel 2 OPDT logic.

9/8/20 0925: Unit 1 Reactor Trip due to OPDT signal. The resulting low reactor coolant system average temperature signal caused a feedwater isolation per design, and the CA System actuated as expected due to an AMSAC signal. The CA pumps started as designed when the valid system actuation was received.

9/9/20: Catawba Unit 1 back on-line.

9/9/20: Reactor power returned to 100 percent.

On September 8, 2020, maintenance technicians had placed the CNS Unit 1 Channel 1 OPDT reactor protection function, among other functions, into TEST to perform routine NIS calibration activities as directed by procedure. When the Channel 2 NIS drawer (1N42) was inappropriately pulled in this condition, spurious reactor power signals were sent to Channel 2 OPDT. The two reactor protection channels provided a signal for an automatic reactor trip and the protection system took the indicated action. Because of the reactor trip, the Auxiliary Feedwater system actuated as expected due to an Anticipated Transient Without Scram Mitigation System Actuation Circuitry signal.

CAUSAL FACTORS

For each human performance related cause, the licensee shall discuss the cause(s) and circumstances.

A cause analysis was completed for the Unit 1 reactor trip event. The cause was found to be, due to overconfidence, a non-licensed, utility personnel maintenance technician did not complete self-checking prior to pulling 1N42 NIS power range drawer from the cabinet rack. No other issues were identified that would have contributed to this event.

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CORRECTIVE ACTIONS**Immediate Actions:**

1. Ensure Catawba Unit 1 had shutdown safely.

Completed Actions:

1. Appropriate accountability and remediation actions performed.
2. Communication performed to Maintenance department emphasizing the importance of taking conservative and deliberate action when performing self-checks prior to manipulating plant equipment.
3. Establish observation report-out expectations and tracker requirements for supervisor's review of all Maintenance plant manipulations with a target focus on specific behaviors.

SAFETY ANALYSIS

At 0925 [EST] hours on September 8, 2020, with Unit 1 in Mode 1 at approximately 100 percent power, the reactor tripped. The Catawba Unit 1 scram did not impact the health and safety of the public and there was no safety or radiological consequence to this event. The OPDT trip signal was caused by a human performance event and did not impact the ability of the reactor to safely shutdown and maintain a safe shutdown condition. The trip was uncomplicated with all systems responding normally post-trip. The crew performed appropriately for the condition. The unit was safely shutdown on September 8 and was restarted on September 9. Unit 2 was not affected. This event does not constitute a Safety System Functional Failure. No system failures occurred and all systems were capable of performing their Safety Function during this event.

ADDITIONAL INFORMATION

A review of previous reportable events for the past three years did not identify any previous similar events.